ECONOMIC INEQUALITY AND PLEASURE SEEKING

Jason W. Hannay

A thesis submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Arts in the Department of Psychology and Neuroscience.

Chapel Hill
2018

Approved By:

B. Keith Payne

Keely A. Muscatell

Paschal J. Sheeran

ABSTRACT

Jason W. Hannay: Economic inequality and pleasure seeking
(Under the direction of B. Keith Payne)

Global trends see rising economic inequality over the past half century. Researchers have examined the effects that this situational shift is having on individuals' thoughts, behaviors, and well-being. Most find that higher economic inequality is related to poor outcomes in domains of health and social behavior. Previous work finds that one pathway by which higher inequality causes poor outcomes is more monetary risk taking (Payne et al., 2017). This paper will expand on that work by examining other pathways that economic inequality can cause poor outcomes in domains of health and social behavior seemingly unrelated to wealth. We offer the explanation that high economic inequality is perceived as high inequality in hedonic experience, and that this will drive a riskier pursuit of pleasure. In three experiments and two observational studies, we found evidence supporting this hypothesis, economic inequality is interpreted as hedonic inequality which drives the risky pursuit of pleasure.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ATUS	American Time Use Survey
BLS	Bureau of Labor Statistics
CDC	Center for Disease Control
HIV	Human Immuno-Deficiency Virus
IAPS	International Affective Picture System
STI	Sexually Transmitted Infection
UNC	University of North Carolina
USA	United States of America
USD	United States Dollar

CHAPTER 1: INTRODUCTION

Economic inequality has reached historic levels in recent years and is still climbing. Because of these shifts, the top 0.1% of Americans now control as much wealth as the bottom 90% (Saez & Zucman, 2016). This trend is not unique to the U.S., as Oxfam reports that the richest 8 people had wealth equal to the poorest 3.7 billion people (Oxfam, 2017).

High economic inequality has been associated with harmful money-making strategies like crime (Choe, 2008), gambling (Freund & Morris, 2005), and greater consumer debt (Frank, 2013). Beyond monetary outcomes, economic inequality is also associated with a wide range of poor health and social outcomes like greater drug abuse, more unintended pregnancies, greater obesity, and shorter life expectancies, (Kawachi, & Subramanian, 2014; Marmot & Sapolsky, 2014; Wilkinson & Pickett, 2009; 2015). This association between high economic inequality and poor outcomes has been observed not only on the national scale, but also at the state, and even county level (Wilkinson & Pickett, 2009). Importantly, economic inequality is not the same as poverty in general. Inequality is the size of the gap between the richest and poorest, not the absolute wealth level of the rich or the poor alone. Thus, these are not simply the problems of the impoverished, as people with a median income show these same patterns within high inequality distributions (Wilkinson & Pickett, 2009).

Though the association between high economic inequality and poor health and social outcomes is well documented, questions remain as to the specific mechanisms by which economic inequality causes these harmful outcomes. We offer the explanation that higher

economic inequality causes these harmful outcomes because it is perceived not only as monetary inequality, but also as inequality in hedonic experiences. For example, a person living in a mansion or driving a luxury car communicates not only that they're very wealthy, but also that their wealth lets them have more fun.

Specifically, we will argue that this perceived hedonic inequality will spur individuals within high economic inequality distributions to engage in more, and riskier, pleasure-seeking behavior. We tested this hypothesis across three laboratory studies, and through archival data searches involving real world pleasure seeking behaviors like promiscuous sex, watching television, and drug use.

Inequality is Harmful

Crime, or the lack of crime, is one indicator used to measure the level of collective well-being in a populace. The level of violent crime particularly is a good indicator of social relations in a given society (Kawachi et al., 1999). This is because crime levels are closely associated with levels of social cohesion in general (Wilkinson, 1997; Kawachi et al., 1997) and levels of general distrust in society (Kawachi et al., 1997; Uslaner, 2002). Income inequality is a contextual factor related to levels of social cohesion and distrust, and through those, crime rates (Kaplan et al., 1996; Krohn, 1976; Kelly, 2000). Specifically, high levels of income inequality are directly associated with more violent crimes like assault and homicide (Kawachi et al., 1999; Kaplan et al., 1996; Kennedy et al., 1996) as well as more economic crimes like robbery, burglary, and motor vehicle theft (Kawachi et al., 1999). These relationships have been observed at both the national and state level (Wilkinson & Pickett, 2009).

Teenage births are considered a problem not only in the domain of social outcomes, like crime, but also in health. One factor that affects the age at which a mother has her first child and the teenage birth rate in general is the level of income inequality in a given area. For example, Chicago area mothers living in neighborhoods with higher inequality gave birth to their first child at a significantly younger age than their counterparts in more equal neighborhoods (Wilson & Daly, 1997). By and large, the teenage birth rate is closely related to income inequality both internationally among 21 wealthy countries and among the 50 states of the USA (Gold, Kawachi, Kennedy, Lynch, & Connell, 2001; Gold, Kennedy, Connell, & Kawachi, 2002; Pickett, Mookherjee, & Wilkinson, 2005).

Beyond the country and state level, the birth rate among teens aged 15 – 17 is strongly associated with income inequality across 400 US counties. Income inequality also predicts the amount of time between pregnancies, where mothers begin subsequent pregnancies quicker in more unequal places (Gold et al., 2004). Importantly, the relationship between income inequality and age of first pregnancy, teenage pregnancy rates in general, and time between pregnancies remains robust even after controlling for per capita income implying inequality has effects independent of poverty alone.

Another outcome that is both a health and social problem is obesity. Obesity rates have sky rocketed in the developed world over the past twenty years (Pickett et al., 2005). Now, over a quarter of the adult population are estimated to have a body mass index (BMI) of greater than 30. Obesity has serious consequences for morbidity and mortality, conveying an increased risk of diseases, including hypertension, type II diabetes, cardiovascular disease, gallbladder disease, and some cancers (Pickett et al., 2005). The rate of change in obesity rates across developed countries imply environmental factors contributing more than genetic explanations. The level of

economic inequality in an area is one such environmental factor found to be strongly related to obesity rates. Indeed, across developed countries for which data are available, income inequality was significantly related to obesity among men and women, diabetes mortality, cardiovascular disease mortality, and average calorie intake (Pickett et al., 2005; Massing et al., 2004; Molarius et al., 2000). These associations are not specific to adults, as children living in more equal places are also more likely to be overweight (Pickett & Wilkinson, 2007).

Like obesity, overdosing on drugs is another type of health problem associated with over consumption. Indeed, drug users are at substantially higher risk of morbidity and mortality than non-drug users (Cherubin & Sapira, 1993). Accidental drug overdoses are a major cause of mortality for drug users and, in many countries, are the leading cause of death in this group (Perucci et al., 1991; Oppenheimer et al., 1994; Frischer et al., 1997). The level of income inequality in a distribution is one contextual factor that contributes to the occurrence rate of drug overdoses. For example, income inequality is significantly associated with risk of overdose across New York City neighborhoods (Galea et al., 2003). This is true even after controlling for individual-level variables like age, race, and sex, and neighborhood-level variables like absolute income level, drug use, and racial composition (Galea et al., 2003).

Notably, the association between income inequality and poor health and social outcomes like crime, obesity, teen pregnancy, and drug overdoses remains robust even after controlling for objective income levels. This means that income inequality has an effect on people's well-being irrespective of poverty itself.

Income Inequality and Stress

One explanation for why higher income inequality is related to poor outcomes independent of poverty is that higher inequality causes more psychosocial stress. Psychosocial stress is "the anticipation, justified or not, that a challenge to homeostasis looms" (Sapolsky, 2005). This is distinct from a physical stressor, which is any external challenge to homeostasis, like a lack of food or extreme temperatures. Psychosocial stressors are typically things like a lack of control and predictability, or a sense of lacking outlets for the frustration caused by a physical stressor. Importantly, while psychosocial and physical stressors are definitionally different, in practice they each affect the body in the same way.

Both of these types of stressors correspond to a "fight or flight" response in humans and animals alike. Such a response involves the activation of endocrine and neural adaptations meant to enable the stressed creature to either "fight" whatever problem they are facing, or "fly" by running away or circumventing the problem. These endocrine and neural changes in response to stress are adaptive because they shift energy to muscle groups in preparation for physical action, increase cardiovascular tone to better facilitate the distribution of energy in the body, and inhibit nonessential anabolism, such as growth, repair, digestion, and reproduction. These adaptations are useful in responding to acute instances of stress. However, prolonged exposure to physical and psychosocial stressors can increase the risk of numerous diseases or exacerbate such preexisting diseases as hypertension, atherosclerosis, insulin-resistant diabetes, immune suppression, reproductive impairments, and affective disorders (Sapolsky, 2005).

One source of psychosocial stress observed in the animal kingdom comes from an animal's position in its social hierarchy (Sapolsky, 2005). When there is a stable hierarchy of

leaders and subordinates, subordinates may experience more stress. This stress comes from having to work harder for food and mates, a relative lack of social control, having less potential grooming partners, and from a lack of other subordinates upon which they can displace aggression (Sapolsky, 2005). Much in the same way animals experience stress by being low in a social hierarchy, people may experience more psychosocial stress in social distributions with more income inequality (Wilkinson & Pickett, 2006).

Research in this vein suggests that higher income inequality can create stress by providing more opportunities to make stressful social comparisons, and through social frustration inherent in an unequal society (Kawachi & Kennedy, 1999). For example, higher income inequality can cause more feelings of personal relative deprivation, which is resentment stemming from the belief that one is deprived of a desired and deserved outcome compared to some referent (Callan et al., 2015). These feelings occur when an individual makes a comparison with a similar other on a given metric (material wealth), decides they are comparatively disadvantaged, and then feels resentment and dissatisfaction as a result. Higher economic inequality provides more opportunities for an individual to make a comparison with someone much better off than they are, increasing feelings of relative deprivation in general (Callan et al., 2015). Feelings of personal relative deprivation are associated with feelings of personal stress (Osborne and Sibley, 2013; Ragnarsdóttir et al., 2013).

The level of income inequality in a given area is a stable environmental factor, meaning that the stress income inequality causes is a chronic issue. Chronic stress causes poor health outcomes in the long run by suppressing immune function and slowing down the body's natural repairing processes. Thus, stress is offered as an explanation that directly explains how higher income inequality causes poor health outcomes. Indeed, stress has been found to mediate the

relationship between feelings of relative deprivation and negative health outcomes (Adjaye Gbewonyo & Kawachi, 2012; Beshai et al., 2017; Lhila & Simon, 2010; Sapolsky, 2005; Yngwe, Fritzell, Lundberg, Diderichsen, & Burström, 2003). Because stress is typically perceived as an unpleasant bodily state, people engage in behaviors meant to reduce feelings of stress (Anderson, 1976). Engaging in more of these "coping mechanisms" indirectly relates the experience of more stress with poor social outcomes like higher teen pregnancy, drug overdoses, and crime rates.

However, while this explanation offers one pathway between high income inequality and poor outcomes it is incomplete. People do not uniformly experience stress in response to high inequality. While high income inequality is certainly stressful sometimes, other times it is seen as necessary byproduct of a meritocratic economy. Indeed, sometimes people report admiring the rich rather than resenting them as relative deprivation theory would suggest. These feelings stem from the belief that the economy should reward those who work harder with more wealth (Newman et al., 2015; Shepelak, 1989). In this way, higher inequality acts as a signal that the economy is working, motivating people to work harder. Thus, this signal is a source of social information that can affect how people behave and think about higher income inequality.

An alternative explanation linking inequality to poor outcomes relies on this idea that higher income inequality acts as social information. This theory asserts that as income inequality rises, so too does perceived economic need, through this social comparison process. As the rich become richer, those in the middle and bottom become less satisfied with what they have, even if their objective wealth level remains unchanged. Higher inequality inflates an individual's sense of need but provides no new avenues of accruing more wealth to meet those needs. With this desperation to fulfill their own needs, individuals become more willing to engage in risky

behavior to gain wealth (Payne et al., 2017). Risky behavior in pursuing wealth is any behavior that has a small chance of netting a very large reward but will most likely result in no gain or even a loss. Corroborating this account, there is a wide literature showing the relationship between feelings of personal relative deprivation brought on by high inequality contexts, and general gambling behavior (Mishra, Barclay, & Lalumière, 2014; Mishra, Son Hing, & Lalumière, 2015, Callan, Ellard, Shead, & Hodgins, 2008; Callan, Shead, & Olson, 2011; Callan, Shead, & Olson, 2015; Haisley, Mostafa, & Loewenstein, 2008, Mishra & Carleton, 2017; Mishra & Novakowski, 2016; Tabri, Dupuis, Kim, & Wohl, 2015).

More risk taking when it comes to money making is a behavioral account that links economic inequality to poor health and social outcomes. For instance, some common, risky, money making strategies include economic crimes like robbery, thievery, and larceny (Daly & Wilson, 2001, Levitt & Venkatesh, 2000). Thus, Payne and colleague's findings can directly explain the relationship between economic inequality and some of the poor social outcomes presented above. However, it is less obvious how more financial risk taking can lead to poor outcomes in seemingly unrelated areas of well-being like obesity rates, drug overdoses, and more teen pregnancy.

One explanation is that linking monetary inequality to non-monetary related health and social problems could be that people associate having more money with having more pleasurable experiences generally. This ideology can be observed in idioms like "money is happiness". If this account were true, then rising monetary inequality would not only change perceived monetary needs, but also perceived needs for positive hedonic experiences. This would imply that in the same way economic inequality causes people to become more willing to engage in risky

behavior to obtain wealth, they should also be engaging in more risky strategies in pursuing positive hedonic experiences.

The risky pursuit of pleasure could cause poor outcomes in the same health and social categories identified by Wilkinson and Pickett. Drug use, for example, may be considered an instance of hedonic risk taking. The user risks negative experiences, from a hangover to incarceration, in order to achieve a positive experience such as euphoria or relief from withdrawal symptoms (Lejuez et al., 2002). Smoking, unprotected sex, overeating, and other health risk behaviors have a similar hedonic risk component (Yates, 1992). Specifically, one could try to gain a positive hedonic experience by eating junk food, or eating a lot in general, which would result in more obesity and poor cardiovascular health over time. Engaging in riskier strategies to obtain sexual pleasure should be related to more unintended pregnancies and the spread of STI's. These behaviors are risky, in that they have a high chance of leading to a positive affective experience, but also have a high chance of leading to poor health and social outcomes for those involved.

However, questions remain as to what features of high economic inequality signal to people within a distribution that inequality is high. People are usually not aware of the exact income and wealth level of those around them. One sort of signal that can demonstrate higher levels of wealth inequality to individuals could be through property displays like having large homes, expensive cars, clothing, and jewelry, and shared photos of vacations or other experiences (Frank, 2010). These sorts of displays, termed "conspicuous consumption", are meant to demonstrate wealth and gain a person more social status. Indeed, one avenue by which people at the bottom of the social ladder can feel more satisfied with their level of wealth is

through these conspicuous consumption displays (Duesenberry, 1949; Frank, 1985; Veblen, 1934).

As economic inequality rises in a distribution there are more displays of conspicuous consumption (Frank, 1985). This in turn provides a signal to others in a distribution that inequality is high. We hypothesize that this signal acts as social information that spurs increased economic needs, as well as increased needs for positive hedonic experiences. We argue that these inflated needs cause individuals to adopt riskier strategies to obtain pleasure of their own, which can result in the poor health and social outcomes found to be associated with higher inequality. Importantly, our position suggests that the increased pursuit of positive hedonic experiences is not an attempt to alleviate stress caused by higher inequality, but instead a goal in and of itself. Thus, our account, offers a novel explanation linking economic inequality to behaviors that result in poor health and social outcomes at large, independent of the stress explanation offered by others in the field.

In summary, we argue that higher inequality in both economic and pleasure domains will cause people to engage in a riskier pursuit of pleasure of their own. We tested this hypothesis across five studies. In study 1, we show that higher inequality in pleasure outcomes caused participants to engage in more risk when trying to obtain pleasure of their own. In study 2 we isolate the feature of higher inequality that causes this effect. In study 3 we show that inequality spurs participants to engage in more risk to obtain pleasure for themselves, regardless of whether the inequality they experience is in the domain of money or pleasure. In study 4 we gathered archival data demonstrating that states with higher economic inequality have residents that spend more time each day engaging in pleasure seeking behaviors. This relationship was mediated by the degree to which a state's residents engaged in more conspicuous consumption. Study 5 builds

on this with archival data that replicates the finding that higher inequality is linked with poor health and social outcomes. Importantly, we find that this relationship is mediated by the level of conspicuous consumption present in a given state. Together these studies show that higher economic inequality leads to potentially harmful pleasure-seeking behavior.

CHAPTER 2: STUDY 1

Overview

Participants played an online game to win picture cards from several different decks. The pictures were of pleasant, unpleasant, and neutral images. For each deck, participants used a sliding scale to indicate whether they would like to draw from the low risk half of the deck (containing neutral images), or the high-risk half (containing highly pleasant and highly unpleasant images). This design allowed us to measure hedonic risk taking by how willing participants were to risk unpleasant affect in order to experience positive affect. Inequality in hedonic experience was manipulated by presenting participants with bar graphs described as previous players' ratings of their experiences in the game. The ratings ranged from "extremely pleasant" to "not at all pleasant." In the high inequality condition, the most satisfied group reported much more pleasant experiences than the least satisfied group. In the low inequality condition, the differences were smaller (see Figure 1 for a schematic illustration of the task). This experimental design allowed us to test whether greater inequality in others' hedonic experiences caused people to take more hedonic risks in pursuit of pleasure. We hypothesized that participants would be willing to engage in more risk to win a highly rewarding card when they are shown a more unequal distribution of past player's experiences.

Method

Participants

One hundred twenty-one adults were recruited via Amazon's Mechanical Turk online platform. This is more than the sixty-five subjects required for .90 power, assuming a small effect size (f = .10), in this within-subjects design. Participants were paid forty cents (USD).

In this sample,50.4% of participants were female, and 72% were white, 12% were black, 5.8% were Hispanic, and 5.8% were Asian. The average age of participants was 39.8, with a standard deviation of 13.6 years. The median income for our sample was between $35,000 and $39,999.

Materials

Images from the International Affective Picture System (IAPS) were used to create the picture cards. The ostensible ratings of previous players were bar graphs constructed by the experimenters. These bar graphs were manipulated to either reflect a highly unequal distribution of outcomes for past players (one where the top one third of players had a much more pleasant experience than the middle third, who in turn had a much more pleasant experience than the bottom third), or an equal distribution of outcomes (one where the top, middle, and bottom third of players had very similar experiences). The sliding scale used to measure risk was anchored by the labels "Mildly Pleasant/Unpleasant" and "Highly Pleasant/Unpleasant". Scale position was measured on a scale from 0 to 100.

Design

The study included two inequality conditions (High inequality and Low inequality) that were manipulated within-subjects on a trial by trial basis. The order of trials was randomized. Each new trial was described as drawing from a new deck of cards with an identical distribution of outcomes as previous decks. Each participant completed ten high inequality trials and ten low inequality trials, for a total of twenty trials each.

Procedure

Participants were instructed that "you will make a series of twenty gambles to win a total of twenty cards to look at from our decks. You will get to view the cards you win at the end of the study." Participants were then shown an image of a deck of cards. Participants made their wagers using the sliding scale. They were instructed that if they move the slider to the far right they are indicating that they wish to make the riskiest possible wager, meaning they may win the most pleasant cards in the deck but also may end up with the most unpleasant cards in the deck. Conversely, by moving the slider to the far left they are indicating that they want to make the least risky gamble possible. Such a gamble would result in the most neutral cards in the deck. On each trial participants saw a bar graph depicting either high inequality or low inequality in previous players' experiences with that deck. At the end of the study all participants viewed twenty pleasant images, and were told in the debriefing that all participants received the same images regardless of their gambling decisions.

Results

Our hypothesis was that participants would take greater hedonic risks when the hedonic outcomes of other players were highly unequal, as compared to when outcomes were less unequal. To test the hypothesis, we averaged the risk responses across trials in the high inequality and low inequality conditions. These risk scores were compared in a repeated measures ANOVA.

Supporting the hypothesis, participants made significantly riskier gambles in the High inequality condition (M = 65.36, SD = 27.18, 95% CI= 60.467, 70.251) than the Low inequality condition (M = 56.66, SD = 25.75, 95% CI = 52.02, 61.29), F= 7.182 (1,120) p = .008. The estimated effect size partial eta squared = .056 See Figure 1 for a visual depiction of these results.

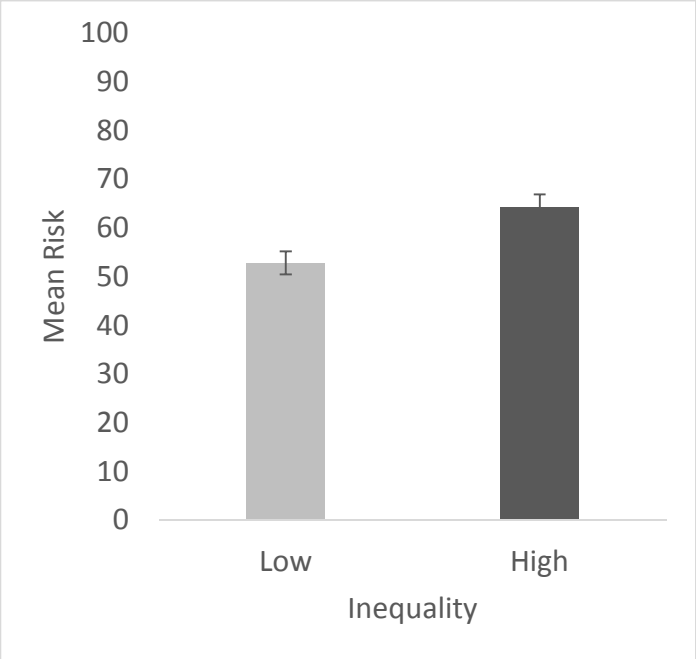

Figure 1.

Discussion

Experiment 1 was designed to measure the degree to which a participant's willingness to engage in more risk to receive a larger reward was affected by shifts in the overall distribution of other player's outcomes. While our hypothesis correctly predicted riskier wagers in response to more unequal distributions, the larger question remained as to what feature of inequality changes risk preferences. We argue that because people have an unequal preference for making upward social comparisons (Boyce et al, 2010) rising inequality in outcomes should make people feel worse off than they truly are. This feeling would then increase their perceived needs, leading to participants engaging in more risks to ensure those needs can be met. This reasoning assumes that people ignore the bottom becoming worse off, and instead focus on the top becoming better off. A person who monitors social information in this way will track how they do compared to the top performers and feel worse off if top performers do particularly well, even if their place in the overall distribution hasn't changed relative to the bottom.

However, a competing hypothesis in this field argues that it isn't an over reliance on upward social comparison that changes risk taking strategies, but instead, an increased focus on the bottom. This "last place aversion" argues that people with low status will go to great lengths to avoid falling into the very bottom, or, last place. Kuziemko et al. (2014) found that participants in the last position in an earnings distribution made the riskiest gambles relative to other positions in order to move out of last place. Therefore, an unequal distribution may motivate people to try and move into the top of a distribution, or may simply motivate people to avoid the very bottom of a distribution. To address this question, we designed Experiment 2.

A standard way to measure upward or downward social comparison is to provide subjects with an opportunity to learn information about other people's characteristics and let

them choose which they prefer to see (Wheeler, 1966). Other research looking at the relationship between distributional inequality and individual level decision making has also made use of this paradigm (Payne et al. 2017). Therefore, we incorporated this social comparison paradigm into our pleasure-seeking study described in Experiment 1 to create Experiment 2.

CHAPTER 3: STUDY 2

Overview

In this iteration, participants completed the game as described in Experiment 1, as well as an additional set of trials in which only partial information was given. This additional set of trials only showed how the average player performed, and left blank how the top and the bottom one third performed. Participants could only choose to see one of the missing bars before making their own wager. By having participants choose which information they wanted to see before making wagers of their own, we could monitor which social information motivated their behavior. We predicted that the more a participant wanted to see how the top was performing, the riskier they would be on high inequality trials.

Method

Participants

Four hundred and one adults were recruited via Amazon's Mechanical Turk online platform. Recruits agreed to participate in exchange for forty cents (USD). Of these 401, 51.1% were female, and 79% were white (6.5% black, 5.5% Hispanic, 6.7% Asian). The average age of our participants was 37.2 years, with a standard deviation of 12.1 years. The median income for our sample was between $35,000 and $39,999.

Design

First, participants completed ten trials of the game as described in Experiment 1. Then, participants completed ten trials of the game with only partial information available, indicating

their preference to make an upward or downward comparison on each trial. Finally, participants completed ten final trials of the full game. As in Experiment 1, this study included two inequality conditions (High inequality and Low inequality) that were manipulated within-subjects on a trial by trial basis. The order of trials was randomized. Each new trial was described as drawing from a new deck of cards with an identical distribution of outcomes as previous decks.

Procedure

Participants first played ten trials of the same game used in Experiment 1 to orient them to the experiment. They then completed ten trials of the game in which we only presented them the middle third of players' outcomes via the same bar graphs used in Experiment 1. The top and bottom bars, representing how the top one third and bottom one third of players performed, were covered. On these ten critical trials participants selected whether they wanted to see the top bar or the bottom bar before making their wager for that trial. After the ten critical trials of comparison selection, participants then played ten trials (five high inequality, five low inequality) of the game exactly as described in Experiment 1. We used these final ten trials as our risk taking dependent variable. Each player had two separate scores calculated: how often they selected the top bar in the information selection block of trials, and how risky they then were in response to high and low inequality information on the final ten trials which showed full distributions. After completing the final ten trials, participants completed a demographics questionnaire and were debriefed to the true nature of the study. Once again, all participants were given a collection of pleasant images only, and were informed that all participants received the same outcome regardless of the wagers they made.

Results

Our hypothesis was that the participants willingness to engage in risk in response to high inequality would increase as a function of their preference for upward social comparison. To test this hypothesis, we scored the ten information selection trials as either a 0 (downward comparison selection) or 1 (upward comparison selection) for each individual participant. These ten "comparison" scores were averaged together to create a mean score to represent their preference for upward comparison.

Across all participants, the mean upward comparison score was .53, with a standard deviation of .361. This score indicated a slight preference for upward social comparison, though this score was not significantly different from chance $t = 1.618$ (1,400), $p = .106$.

Next, we examined whether upward comparison moderated the degree to which participants preferred riskier wagers when responding to a high inequality bar graph. To do so, we mean centered the upward comparison scores and included this variable as a moderator in a repeated measures ANOVA. We found a significant interaction between inequality level and upward comparison score, $F = 41.64$ (1, 399), $p < .001$. At low levels of upward comparison, participants' wagers became riskier when they were presented with low inequality distributions (Mean risk = 56.67, 95% CI = 49.82, 63.52) as opposed to high inequality distributions (Mean risk = 35.64, 95% CI = 28.76, 42.52). When upward comparison was at its mean level participants made riskier wagers in response to high inequality (Mean risk = 64.36, 95% CI = 62.02, 66.69) compared to in response to low inequality (Mean risk = 52.78, 95% CI = 50.46, 55.1), replicating the results of Experiment 1. At high levels of upward comparison, wagers became much riskier in response to high inequality (Mean risk = 93.07, 95% CI = 86.2, 99.9) as

compared to in response to low inequality (Mean risk = 48.89, 95% CI = 42.05, 55.73). See Figure 2.

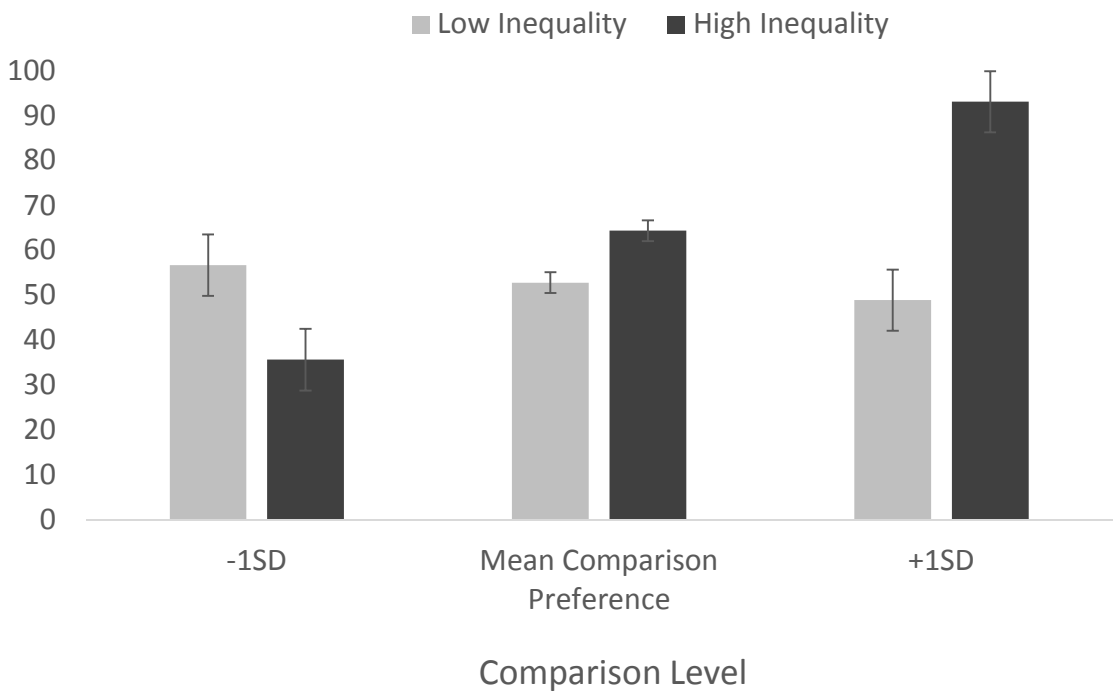

Figure 2.

These results indicated that the more a participant preferred upward comparison, the riskier they were in response to higher inequality. Conversely, the more a participant preferred downward social comparison they were less risky in response to high inequality, and in fact, became more risk seeking in response to lower inequality.

Discussion

The results of experiment 2 answer the larger question regarding what feature of inequality motivates shifting risk preferences. Participants were more concerned with their standing relative to the top of the distribution rather than the bottom. This pattern of results is in line with prior work linking economic inequality to economic risk taking (Payne et al., 2017). In that study, participants propensity to engage in wealth related risk taking was directly related to

their concern with how the top of an economic distribution was performing. Those results provided one avenue through which changes in an economic distribution could affect individuals' behavior in a way that led to poor health and social outcomes. However, that account does not explain how economic inequality could lead to negative health and social behaviors unrelated to monetary gain, like deaths due to drug use, the spread of sexually transmitted infections, and obesity.

While experiments 1 and 2 provide some support for the idea that inequality in pleasure outcomes contributes to negative health and social outcomes by perpetuating riskier pursuit of pleasure, questions remain as to whether or not people are generally aware of systemic inequality in other people's pleasure. However, one possible way people become aware of inequality in pleasure outcomes may be a conflation of economic and pleasure inequality. In other words, people may be able to see inequality in monetary outcomes and then assume that this implies there is inequality in how much pleasure people have in their lives as well. Such an account would postulate the idea that affect acts as a common currency linking monetary inequality to hedonic inequality. If this account were true then we should be able to see an effect of different levels of monetary inequality on an individual's willingness to engage in risk to obtain pleasure of their own. Beyond that, this effect should be especially pronounced when other player's monetary outcomes are overtly labeled in such a way that suggests people who won more money also had a much more pleasant experience with their winnings. To test this idea we developed experiment 3.

CHAPTER 4: STUDY 3

Overview

In experiment 3 participants played a modified version of the decision game that is discussed in experiment 1. As before, participants are told they will make a series of twenty gambles in order to win twenty different picture cards. These cards are meant to elicit varying degrees of pleasure. The previous iteration of the game gave participants outcome information for players who had also played the game to win picture cards. In this iteration, participants are told that the outcome information we give them is from players who made wagers to win money, rather than picture cards. We predicted that participants would make riskier wagers for pleasure of their own when they saw higher inequality in past player's performance, even though the inequality was in the domain of money rather than pleasure. We also predicted this effect would be more pronounced when the monetary inequality displayed was labeled in a way that specifically communicated differences in pleasure outcomes.

Method

Participants

330 adults were recruited. 153 of those were UNC Business school students and 177 were recruited via Amazon's Mechanical Turk online platform. UNC students were given 1 course credit for participating while Amazon's MTurk recruits agreed to participate in exchange for forty cents (USD). Of the 330 participants, 41.2% were female, and 77% were white (4.2% black, 4.2% Hispanic, 10.9% Asian). The median income for our sample was between $75,000

and $85,000. The median income was probably higher for this sample due to the inclusion of business school students, who reported coming from wealthier than average households.

Materials

Information regarding inequality levels was again presented as a graph with three bars showing each third of players separated by their monetary outcomes. Half of the participants saw these bar graphs with no additional labels. The other half of the participants saw graphs which had labels on the x-axis portraying how much pleasure each third of players reported having, on average, as well as their monetary outcomes. See materials for examples of bar graphs. Therefore, half of the participants saw a distribution that only reflected monetary inequality, but did not overtly tell them about any differences in pleasure past players experienced. The other half of the participants were directly told that the players who won the most money had the most pleasant experience, and the players who won the least money had the least pleasant experience.

We made two predictions for this experiment: First, participants who only saw the level of monetary inequality in past player's outcomes would make riskier gambles for pleasure of their own when inequality was high, even though the information they are shown has nothing to do with pleasure outcomes. Second, participants who were explicitly told how much pleasure past players got from their winnings would make even riskier gambles in response to high inequality, compared to the participants in the uncertain condition.

Procedure & Design

All participants completed the study via a computer. Participants were randomly assigned to see either the money outcomes only bra graphs or the money with pleasure labels graphs via Qualtrics, an online survey program. Participants were all given the same cover story, that they are going to play a game to win picture cards and that to help them make their gambles they will be

given information from previous iterations of the game. Participants then made gambles on twenty trials of the game.

The study included two inequality conditions (High inequality and Low inequality) that were manipulated within-subjects on a randomized trial by trial basis. Each participant made 20 total wagers, 10 of the wagers in response to an unequal distribution and 10 wagers in response to an equal distribution. The study also included two information conditions manipulated between subjects at the start of the experiment. Thus, this study used a mixed model design, where the type of information presented was manipulated between subjects (Money only vs money with pleasure), but the level of inequality in outcomes was manipulated within subjects (High vs Low) across twenty trials. This gives us a 2 (Type of information presented) x 2 (level of inequality in outcomes) model for analyses. After completing the 20 trials participants are given a basic demographic questionnaire and are debriefed to the true nature of the study.

To score each participants' trials we averaged each participant's risk score across the ten high inequality distribution trials, and the ten low inequality trials they saw throughout the experiment.

Results

First, we had hypothesized that as inequality went up, participants would engage in more risk to obtain potentially greater pleasure outcomes for themselves. Second, we hypothesized an interaction qualified by the type of information shown. Specifically, we hypothesized that the effect of high monetary inequality on risk taking would be larger when those monetary outcomes were labeled in such a way that communicated to the participant that past players who won more money also got more pleasure from the experiment. We tested these hypotheses via an ANOVA

for repeated measures with a two (inequality level) by two (information shown) design. The test, $F = 32.742$, (1,329), $p < .001$, partial eta squared = .091, showed a main effect of inequality. Participants were riskier when shown high inequality distributions (Mean risk = 66.99, 95% CI = 64.65, 69.33) than when they were shown low inequality distributions (Mean risk = 56.45, 95% CI = 54.15, 58.74). There was an interaction between the level of inequality expressed and the condition the participants took part in, $F = 7.188$, (1,328), $p = .008$.

When participants (n = 161) were shown monetary outcomes only, with no additional labels communicating pleasure outcomes, we observed a simple effect $F = 4.675$, (1,160), $p = .028$, partial eta squared = .028. These participants were riskier when shown high inequality distributions (Mean risk = 64.5, 95% CI = 61.01, 67.99) as compared to low inequality distributions (Mean risk = 58.97, 95% CI = 55.9, 62.05). When participants (n = 169) were shown monetary outcomes with additional labels expressing pleasure differences we observed a simple effect $F = 34.663$, (1,168), $p < .001$, partial eta squared = .171. These participants were riskier when shown high inequality distributions (Mean risk = 69.35, 95% CI = 66.23, 72.48) as compared to low inequality distributions (Mean risk = 54.03, 95% CI = 50.66, 57.42). This effect size is more than quadruple the effect size observed in the "monetary outcomes only" condition. See Figure 3.

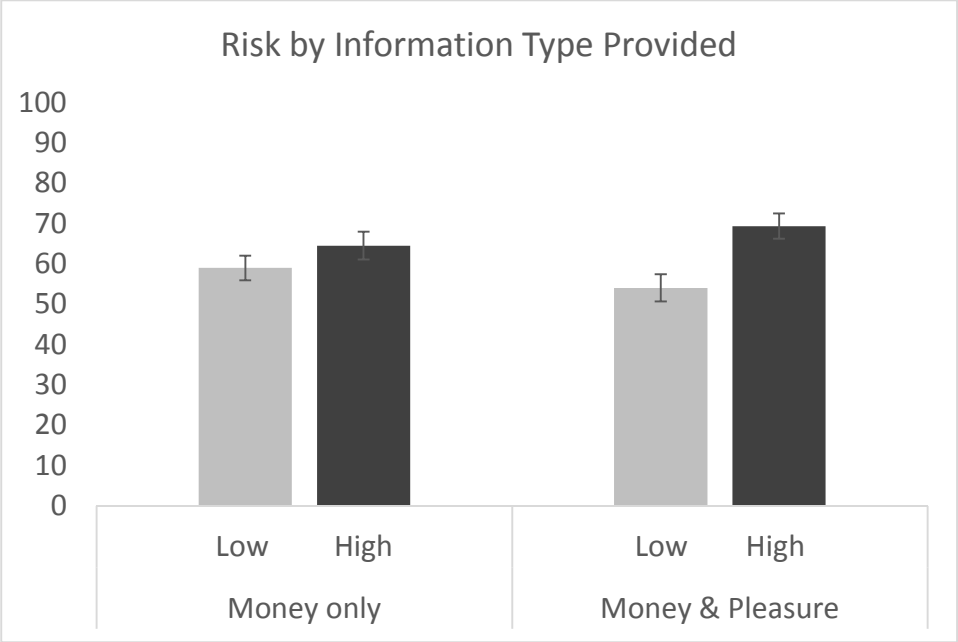

Figure 3.

Discussion

Experiment 1 showed that high inequality in pleasure outcomes drives people to engage in more risk to obtain pleasure of their own. Experiment 2 clarified this idea by showing that inequality drives behavior due to an over concern with how much the top has rather than how little the bottom has. Experiment 3 took this idea a step further by demonstrating that people conflate monetary inequality with pleasure inequality. People assume that the people with the most money are having the most fun. This in turn drives people to engage in more risk to obtain pleasure of their own, just as in experiment 1 and 2. Experiment 3 has important implications for real world behaviors. As economic inequality rises, people living in higher inequality areas will be more likely to engage in riskier behaviors meant to gain them more pleasure.

Risky behaviors can cause negative outcomes in two main ways; first, the behavior may gain a person small, immediate satisfaction at the expense of long term well-being, like eating

unhealthy foods, or engaging in promiscuous sexual behavior. Second, the behavior may have a small chance at bringing a lot of pleasure, but more than likely will result in negative long term outcomes for the individual, like drug use. Importantly, we also demonstrate that the conflation of economic inequality and pleasure inequality is magnified when the economic inequality is overtly expressed as pleasure inequality. It seems people naturally conflate the two, but when the relationship between the two are made obvious, behavioral impacts become magnified. These patterns of risky behavior at the expense of long term wellbeing directly link economic inequality to the poor health and social outcomes discussed in Wilkinson and Pickett's research (2008).

CHAPTER 5: STUDY 4

Overview

Experiments 1-3 provide preliminary evidence linking systemic levels of inequality in monetary and pleasure outcomes with the individual's willingness to take risks to obtain pleasure of their own. Such evidence was obtained using rigorous scientific methods as to rule out alternative explanations for the behaviors observed in a lab setting. While performing tightly controlled scientific studies are a necessary step in proving causality, there are known drawbacks to this approach, namely, generalizability. If there were indeed a link between economic inequality, inequality in pleasure outcomes, risk taking, and overall pleasure seeking, then we should be able to observe every day behaviors that mirror the relationship. To examine this relationship through a lens more widely focused, we conducted study 4.

Study 4 involved a search through publicly available, archival, data that would provide insight into how people spend their time. If our lab results were generalizable, then there should be a quantifiable relationship between the level of economic inequality in a state and the amount of time that state spends engaging in pleasurable activities. The Bureau of Labor Statistics (BLS) collects this type of information annually in the form of their "American Time Use Survey". This survey gathers a representative sample from each state and asks participants to self-report what they do in a typical day and how much time they spend doing it. These robust datasets provide an opportunity to examine the relationship between state level characteristics, like level of economic inequality, and behavior at the individual level. Beyond that, we can also gather state

level data that can let us further test our hypothesis from study 3, that economic inequality expressed overtly as pleasure inequality drives an individual's pursuit of pleasure.

Differences in wealth among individuals are typically displayed through the purchase and consumption of luxury goods (Walasek, 2015). This type of "conspicuous consumption" includes behaviors like buying sports cars, large houses, designer clothes, and dining in expensive restaurants. These overt displays of wealth should act like the labels provided on the graphs of monetary inequality in study 3. They signal to others that the consumer is very wealthy, and that they can afford to enjoy their wealth in the form of pleasurable products and experiences. Therefore, we should observe a relationship between the rate at which people in each state consume luxury goods, and the rate at which people seek pleasurable experiences in those states, on average.

One potential alternative explanation as to what drives pleasure seeking behavior in high inequality areas is stress relief. It could be the case that higher economic inequality puts pressure on individuals to obtain more wealth which causes stress. Then, to relieve this additional stress, people engage in pleasure related activities more. However, we argue that the effect economic inequality has on pleasure seeking behaviors is independent of the effect of stress. To rule stress out as an alternative explanation, we also gathered state level data on the occurrence of stress and included it in our model. Taking together, if our hypothesis is correct, we should be able to observe a significant effect of economic inequality on time spent engaging in pleasure seeking behavior. Beyond that, we should see the consumption of luxury goods mediate this relationship. And finally, this relationship should not be accounted for by the level of stress within a given state.

Measures

The Bureau of Labor Statistics annually collects data on daily behavior in their "American Time Use Survey". This survey gathers a representative sample from each state and asks them to self-report what they do in a typical day, and how long the spend doing it.

These data are released as summary tables of these activities separated on a state by state basis. Similar behaviors are combined into larger categories. For example, some of the categories are: "personal care activities", "eating and drinking", "household activities", and "leisure and sports." A full list of the categories are included in the appendix. Of these larger categories, we decided a priori that only one pertained directly to activities done for the sake of pleasure, namely, "leisure and sports."

The "leisure and sports" category contains several different behaviors, all typically done for the sake of obtaining pleasure. These activities include: "socializing and communicating", "relaxing and thinking", "watching television", "reading", "playing games", "computer and internet use for leisure", "participating in sports, exercise, and recreation", "other leisure and sports activities", and "travel related to leisure and sports activities."

First, to test our hypothesis that states with higher income inequality spend more time engaging in pleasure seeking activities, we used linear regression model to test the relationship between the level of economic inequality in each state and the amount of time spent engaging in pleasure activities. To do this we used the total amount of time spent per person in the broad category of "leisure and sports" as our dependent variable. This category level variable was ideal for these analyses because it encompassed a wide range of pleasure seeking activities.

The variable we used to represent the level of economic inequality in a state was the Gini co-efficient. This coefficient represents how evenly the wealth within a system is spread across the population. A Gini coefficient of "1" implies the one person within an entire distribution possesses all of the wealth in that distribution while everyone else has no wealth. Conversely, a Gini coefficient of "0" implies that every person in a distribution of people has the exact same level of wealth. To rule out increased poverty within a state as an explanation for our hypothesis we also included each state's median income level as a control variable.

To test our hypothesis that economic inequality would have a more pronounced effect on risk taking when the inequality is expressed in an overt way, we made use of a metric created by Walasek and colleagues in their 2015 paper on the relationship between inequality and luxury goods. Using google correlate to look at the rate at which people in each state search for different items, they found that of the 40 search terms used more frequently in states with greater income inequality, more than 70% were classified as referring to status goods (e.g., designer brands, expensive jewelry, and luxury clothing). We then used these status goods identified by Walasek to create an index of luxury goods searches. A larger score on this index implies that people within a state spend more time searching for luxury goods and experiences. This index of luxury goods searches should account for any relationship between the gini coefficient in each state and the rate at which people in that state engage in pleasure seeking activities.

Finally, the data for the level of stress we used in our model came from a Gallup survey conducted in 2012. This survey gathered a large, representative sample from each state and surveyed them as to what they had felt the previous day. Results came from daily telephone interviews conducted as part of the Gallup-Healthways Well-Being Index survey between Jan. 1-Dec. 31, 2012. The survey had a random sample of 353,564 adults, aged 18 and older, living in

all 50 U.S. states selected using random-digit-dial sampling. The item relevant to these analyses was “Did you experience the following feelings during a lot of the day yesterday? How about stress?” Gallup took the proportion of respondents per state that answered “yes” and reported these scores as a percentage. Those scores were included in our model as a robust measure of stress rates within each state.

Method

Data from the BLS were available for each state from 2006-2015, except for Michigan which did not have data for 2010, so we instead used data from 2005 to supplement the missing data. An average was taken across the available years of data to create a mean score for each state. Our index variable (time spent in total engaging in “sports and leisure”) was then entered into a linear regression as the outcome variable. We then ran three separate models to test each portion of our hypothesis in turn. Model 1 only included median income and the Gini coefficient, Model 2 added in our luxury goods item, and Model 3 added in our measure of stress.

Results

Linear regression confirmed our original hypothesis; as the level of economic inequality rose within a state, that state’s residents spent more time each day “engaging in sports and leisure”, which included a wide range of pleasure seeking behaviors. This relationship holds even after controlling for the absolute level of wealth within each state. The broad category of pleasure seeking behaviors was positively predicted by the level of economic inequality in each state, as measure by the Gini coefficient. See Table 1 for a model summary.

Outcome: ATUS Pleasure Seeking Behaviors (z-scored) R^2 =.32			
	Model 1	Model 2	Model 3
Median Income	-.263	-.354*	-.354*
Gini Coefficient	.323*	-.048	-.041
Luxury Goods Index		.454*	.440*
Stress			.070

* $p < .05$; ** $p < .01$; *** $p < .001$

Note: Coefficients are unstandardized. Variables were standardized before being entered into the model.

Table 1.

Beyond that, the index of searchers for luxury goods fully accounts for the variance in pleasure seeking behavior predicted by the Gini Coefficient. This implies that the relationship between economic inequality and pleasure seeking is explained by overt, public displays of wealth disparities through luxury good consumption. Importantly, we demonstrate with this model that stress does not account for any differences in pleasure seeking behavior among the states.

Discussion

It seems that as economic inequality within a state goes up, people spend more time and effort searching for and consuming luxury goods. Consuming these luxury goods signals to the people around them that there are wealth disparities, but also that more wealth leads to more fun. These signals are social information people then use to shape their own perceptions of how much pleasure they should be experiencing as well. These shifted perceived needs then drive pleasure seeking behavior, an important byproduct of which is a riskier pursuit of pleasurable outcomes in general. Thus, these real-world results mirror the relationship we observed in studies 1 through 3,

suggesting real world behavioral implications for higher economic inequality. Furthermore, this pattern of results imply that wealth disparities may drive pleasure seeking behavior not to avoid pain, but for the sake of having more pleasure in and of itself.

Notably, though the data sets the BLS collects each year are robust, they are self-report in nature. The well-known drawback to self-report data is a motivation on the part of the participant to present themselves in a way that would not hurt their social reputation. This could prevent participants from reporting on activities that are of interest to our pleasure-seeking hypothesis, namely, drug use and risky sexual behaviors. Those types of behaviors are highly associated with obtaining pleasure but not acceptable to engage in throughout many social circles. To gather data regarding the occurrence of these types of behaviors we had to look to the Center for Disease Control (CDC). We used these data from the CDC to conduct study 5.

CHAPTER 6: STUDY 5

Overview

Study 4 provided initial evidence for the hypothesis that rising economic inequality leads to more pleasure-seeking behaviors. However, while the items used in the previous analysis did represent pleasure seeking behaviors, they could only indirectly explain why there is a statistical relationship between higher economic inequality and some of the poor health and social outcomes discussed previously. For instance, spending more time relaxing, thinking, playing sports, engaging in leisure, and watching TV could indirectly explain why areas with higher economic inequality have more obesity, but fail to explain why those same areas have more drug use, drug deaths, teen pregnancy, and more occurrences of, and deaths from, preventable diseases. So, while Study 4 was useful in establishing that the effects observed in a lab setting generalized to the real world in some aspects, further testing needs to be done to examine how pleasure seeking spurred by economic inequality directly leads to poor health and social outcomes. As such, a fifth study was necessary to better examine the relationship between economic inequality, pleasure seeking behaviors, and poor health and social outcomes.

While it is difficult to collect data on the drug use behaviors of residents in each state due to the self-report aspect of such surveys, the amount of deaths due to drug overdoses in each state can accurately represent the amount of drug use in each state more generally. The Center for Disease Control (CDC) records the number of people who die each year, by state, and categorizes them by cause of death. One such category, deaths due to overdosing on narcotics

(X42), provides useful data that can be used to test the hypothesis that increased economic inequality spurs pleasure seeking in the form of increased drug use.

However, drug use data in the form of cigarette consumption is much easier to obtain. Cigarette consumption is a pleasure-seeking activity that directly leads to poor health outcomes. For that reason, we used CDC data regarding cigarette consumption among residents in each state in our model as an outcome variable.

Other pleasure seeking behaviors that could directly lead to some of the poor health outcomes discussed above include more unsafe, riskier, and more promiscuous sexual behavior. However, accurate data regarding average number of sexual partners and propensity to use contraceptives are unavailable for some states. This is due to a number of reasons, not least of which is the fact that there is a social pressure for participants in such surveys to misrepresent their behavior. Therefore, alternative data that represents the occurrence of these behaviors are also necessary. To those ends, occurrence rates for Sexually Transmitted Infections (STIs) can adequately portray unsafe, and risky sexual activity.

The Center of Disease Control (CDC) also collects data on the number of new sexually transmitted infections (STIs) that occur each year, separated by state. These data include STIs like Chlamydia, Gonorrhea, Syphilis, and Human Immuno-Deficiency Virus (HIV). These types of behaviors are exactly the kind of pleasure seeking behaviors that we are interested in for our hypothesis. These data give us the potential to observe a direct relationship between the level of economic inequality in a state and poor health and social outcomes.

Importantly, a relationship between economic inequality and poor health and social outcomes has been observed before (Wilkinson & Pickett, 2008). However, our hypothesis

builds on that research by suggesting the avenue by which economic inequality spurs these outcomes is through pleasure seeking. Specifically, we argue that economic inequality leads to poor health and social outcomes when that inequality is overtly displayed through the purchase and consumption of luxury goods.

Measures and Method

Data for STI rates were only publicly available from (2008 to 2015). The researchers added the number of raw cases for each type of infection by state and averaged them together to create the mean number of new cases of STI's per year, per state. These means were recalculated to reflect per capita rates, and then averaged together across all available years (2008-2015). The resulting number for each state represented the per capita rates of new STI infections per year. These scores were then standardized before being entered into the regression model.

Regarding the deaths from narcotics overdoses each year, the CDC release their data in raw numbers by state. We took these raw numbers from the year 2006 to 2015 and recalculated the narcotics death rates to reflect per capita numbers. These per capita rates were then averaged across the 10-year span to give us the mean, per capita, number of deaths in each state due to narcotics.

Data on cigarette consumption was available from the CDC for the years 2010 and 2014. Specifically, the CDC reported how many cigarettes a day self-identified smokers consumed, separated by state. We averaged data from these two years together into a single item.

Each of the three outcome variables, STI rates, cigarette consumption, and deaths from narcotics overdoses were standardized and then combined into a single index item. This index

variable was then entered into a linear regression as the outcome variable. We used the same predictor and control variables as described in study 4.

Results

Our model yielded significant results suggesting that the level of economic inequality in a state positively predicted the occurrence of several different STIs, cigarette consumption, and the number of deaths from narcotics overdoses in that state. This relationship holds even after controlling for the absolute level of wealth within each state. Our outcome variables were positively predicted by the level of inequality in each state both individually, and when combined into an index item. These results fell in line with our hypothesis that increased economic inequality leads to more pleasure-seeking behaviors. See Table 2 for a model summary.

	Outcome: CDC Index (z-scored) R^2=.47		
	Model 1	Model 2	Model 3
Median Income	-.211**	-.278***	-.278***
Gini Coefficient	.186*	-.084	-.072
Luxury Goods Index		.331**	.306**
Stress			.123

* $p < .05$; ** $p < .01$; *** $p < .001$

Note: Coefficients are unstandardized. Variables were standardized before being entered into the model.

Table 2.

As in study 4, we again find that the relationship between economic inequality and pleasure-seeking behaviors is explained by our luxury goods item. This implies that as economic inequality goes up people search for and consume more luxury goods, this in turn causes more pleasure-seeking behavior when it comes to smoking cigarettes, taking narcotics, and engaging in risky, unsafe sex. Also, as in study 4, we find that the amount of stress people in each state experience did not account for differences in pleasure seeking behavior across each state.

Discussion

We successfully replicated the pattern of results we observed in study 4. As economic inequality rose in a state people engaged in more unhealthy pleasure-seeking behavior. Beyond that, this relationship is explained by the overt display and consumption of luxury goods. This research builds on relationships already demonstrated by past researchers (Wilkinson & Pickett, 2008), in that we better understand how economic inequality causes poor health and social outcomes. As we show in experiments 1 through 3, information as to how much pleasure other people are having affects a person's willingness to engage in risk to obtain pleasure of their own. As some people experience more and more pleasure, people in general feel an increased need to get pleasure of their own, leading them to engage in more risk to get it. This risk has manifested itself in the real world through risky behaviors like smoking, drug taking, and risky, unsafe sex.

Study 5 paints a clearer picture as to how economic inequality causes these types of behaviors. As inequality rises, people display their wealth through luxury goods. People see the widespread consumption of luxury goods and shift their needs so that they feel they have to have these types of pleasures as well. When they cannot afford to purchase the same types of pleasures, they resort to riskier, unhealthy behaviors to fill their need for pleasure. Again, this

relationship seems to be specific to pleasure-seeking rather than pain-avoiding, given that stress levels did not explain the behaviors we observed.

CHAPTER 7: GENERAL DISCUSSION

In three experiments and two observational studies, we found evidence that economic inequality is interpreted as hedonic inequality and this drives the risky pursuit of pleasure. Study 1 demonstrated that high inequality in hedonic experiences causes a riskier pursuit of pleasure among participants. Study 2 built on this by showing that this effect is driven by a preference to make upward social comparisons. Study 3 demonstrated that inequality spurs participants to engage in more risk to obtain pleasure for themselves, regardless of whether the inequality they experience is in the domain of money or pleasure.

Study 4 looked at pleasure seeking behavior outside of a laboratory setting. We found that in states with higher economic inequality people spent more time engaging in pleasure seeking activities in general, like watching TV, playing games, or reading. Study 5 used archival data to link higher economic inequality in a state with more drug use, promiscuous sex, and cigarette smoking. Studies 4 and 5 both demonstrated that the association between income inequality and pleasure seeking was mediated by consumption of luxury goods. Importantly, these relationships remained robust even after controlling for a state's median income level and general stress level. This suggests that higher economic inequality is uniquely associated with behavior and well-being independent of poverty alone. It also means stress alone as an explanation cannot predict why high economic inequality is associated with behaviors that lead to poor health and social outcomes.

Taken together, these studies show that high economic inequality is associated with the consumption of more luxury goods, this in turn signals to individuals in a distribution that both monetary and hedonic inequality are high. Higher inequality then inflates individuals perceived needs for pleasure. Higher needs for pleasure then drives them to engage in more pleasure-seeking behavior in general, and in risky pleasure-seeking behavior. This research provides strong evidence for a causal link between higher economic inequality and poor health and social outcomes for individuals. It has been widely shown that areas with more income inequality have more teen pregnancy, obesity, deaths from drug overdoses, and poor health outcomes in general. Taking our explanation into account, it becomes more clear how economic inequality directly leads to these outcomes. Inflated needs for pleasurable outcomes can drive a person to eat more food generally, and food that is high in sugar and fat, leading to obesity. Inflated needs for pleasure can also spur a person to engage in more promiscuous, and riskier, sexual behaviors, leading to the spread of STI's and more teen pregnancy. The consumption of illicit drugs or cigarettes are other behaviors a person could be driven to perform if they feel they need to obtain more pleasure in their life. Such behavior would lead to more drug overdoses, and worse health outcomes in the long run.

These health and social problems, obesity, the spread of STI's, teen pregnancy, illicit drug and cigarette consumption are strongly associated with poverty. Typically, areas with higher poverty have worse outcomes in these areas. Our pleasure-seeking explanation relates higher income inequality with poor outcomes while holding poverty constant. Holding poverty constant allowed us to examine what unique effects qualities of the economic distribution has on people's cognitions and behaviors. Our account implies that knowing the distribution of wealth around the mean is predictive above and beyond only knowing the mean alone. Demonstrating

that high economic inequality affects people differently than poverty itself helps explain why the wealthiest countries and states still suffer these poor health and social outcomes. Our explanation can account for why two countries or states with identical median incomes can have drastically different rates of poor health and social outcomes. Poverty alone as an explanation cannot.

Our explanation also predicts behaviors and cognitions independent of the stress explanation popularly asserted by Wilkinson & Pickett. The stress account suggests that people feel stressed when they perceive themselves as being lower in social rank than the people near them. Areas with high economic inequality have many high-status individuals to compare to, by definition. The widespread availability of very high-status people to compare to creates stress in individuals of low status. Prolonged stress then causes physical damage to a person's body, leading to long term health problems. In the short term, increased levels of stress may drive individuals to engage in coping behaviors meant to alleviate that stress, or at least distract from the source of their stress. This account relies on the idea that people respond to high economic inequality by feeling personally deprived, or by resenting those wealthier than them. These feelings of resentment cause stress, which in turn lead to the poor health and social outcomes.

Our account acknowledges that stress is not the only response to high economic inequality. Indeed, sometimes people respond to high inequality with admiration of the rich rather than resentment. Instead, our account argues that people use available social information to shape their behaviors and cognitions. The level of economic inequality in an area is one source of this social information. High levels of economic inequality are signaled through the increased consumption of luxury goods, or conspicuous consumption. Individuals who see others engaging in more conspicuous consumption may conclude that those other people have both more wealth and more pleasure in their lives because of their wealth. This in turn may drive them to engage in

more pleasure-seeking behavior, and in riskier pleasure-seeking behavior to gain more pleasure for themselves. This tendency to pleasure seek can then lead to poor health and social outcomes in both the short and long term. Therefore, while the stress explanation predicts outcomes for people who respond to higher inequality with more stress, our explanation predicts outcomes more generally.

Limitations

Although we did not find any evidence that stress explained the association between inequality and pleasure-seeking n in our two studies using archival data, we did not control for stress in any of our three laboratory studies. The design of all three studies did not provide an opportunity to measure the amount of stress participants felt in response to each bar graph they were shown. However, we do not think that the bar graphs participants were shown would influence how stressed they were feeling. This is for three reasons; first, because participants know that they are not playing for large sums of money. Second, because we did not label the bar graphs to show the exact amounts of money other players won. This provides little potential to become stressed by other players outcomes. Finally, participants did not receive any information as to how they were performing throughout any of the three studies. Because they could not know how much they had won so far, or how much they had missed out on winning, we do not think stress is a reasonable explanation for our experimental findings.

A second limitation of the study was the type of the archival data available. also limited in the type of archival data that was available. While the amount of drug overdoses a state had is valuable information for a test of our hypothesis, a clearer test would be the amount of drugs people consume more generally. This would include both illicit and prescription drugs that may not result in death.

Conclusion

Decades of research has shown that high economic inequality is associated with bad health and social outcomes. Recent research partly explained this relationship by suggesting inequality can cause poor monetary outcomes by increasing economic risk taking. However, the pathway from monetary inequality to health and social outcomes that have little to do with money has remained unclear. In our research we find evidence that affective experiences of pleasure provide a common currency linking income inequality to health and social behaviors. In this way, our research sheds light on why inequality in the domain of wealth can cause behaviors that seemingly have nothing to do with the pursuit, or lack, of wealth.

REFERENCES

Adjaye-Gbewonyo, K., & Kawachi, I. (2012). Use of the Yitzhaki Index as a test of relative deprivation for health outcomes: a review of recent literature. *Social science & medicine*, *75*(1), 129-137.

Anderson, C. R. (1976). Coping behaviors as intervening mechanisms in the inverted-U stress-performance relationship. *Journal of Applied Psychology*, *61*(1), 30.

Beshai, S., Mishra, S., Meadows, T. J., Parmar, P., & Huang, V. (2017). Minding the gap: Subjective relative deprivation and depressive symptoms. *Social Science & Medicine*, *173*, 18-25.

Boyce, C. J., Brown, G. D., & Moore, S. C. (2010). Money and happiness: Rank of income, not income, affects life satisfaction. *Psychological Science*, *21*(4), 471-475.

Callan, M. J., Ellard, J. H., Will Shead, N., & Hodgins, D. C. (2008). Gambling as a search for justice: Examining the role of personal relative deprivation in gambling urges and gambling behavior. *Personality and Social Psychology Bulletin*, *34*(11), 1514-1529.

Callan, M. J., Kim, H., & Matthews, W. J. (2015). Predicting self-rated mental and physical health: The contributions of subjective socioeconomic status and personal relative deprivation. *Frontiers in psychology*, *6*, 1415.

Callan, M. J., Shead, N. W., & Olson, J. M. (2011). Personal relative deprivation, delay discounting, and gambling. *Journal of personality and social psychology*, *101*(5), 955.

Cherubin, C. E., & Sapira, J. D. (1993). The medical complications of drug addiction and the medical assessment of the intravenous drug user: 25 years later. *Annals of internal medicine*, *119*(10), 1017-1028.

Choe, J. (2008). Income inequality and crime in the United States. *Economics Letters*, *101*(1), 31-33.

Daly, M., Wilson, M., & Vasdev, S. (2001). Income inequality and homicide rates in Canada and the United States. *Canadian J. Criminology*, *43*, 219.

Duesenberry, J. S. (1949). Income, saving, and the theory of consumer behavior.

Frank, R. (2013). *Falling behind: How rising inequality harms the middle class* (Vol. 4). Univ of California Press.

Frank, R. H. (1985). *Choosing the right pond: Human behavior and the quest for status*. Oxford University Press.

Freund, E. A., & Morris, I. L. (2005). The lottery and income inequality in the States. *Social Science Quarterly*, *86*(s1), 996-1012.

Frischer, M., Goldberg, D., Rahman, M., & Berney, L. E. E. (1997). Mortality and survival among a cohort of drug injectors in Glasgow, 1982–1994. *Addiction*, *92*(4), 419-427.

Galea, S., Ahern, J., Vlahov, D., Coffin, P. O., Fuller, C., Leon, A. C., & Tardiff, K. (2003). Income distribution and risk of fatal drug overdose in New York City neighborhoods. *Drug & Alcohol Dependence*, *70*(2), 139-148.

Gold, R., Connell, F. A., Heagerty, P., Bezruchka, S., Davis, R., & Cawthon, M. L. (2004). Income inequality and pregnancy spacing. *Social Science & Medicine*, *59*(6), 1117-1126.

Gold, R., Kawachi, I., Kennedy, B. P., Lynch, J. W., & Connell, F. A. (2001). Ecological analysis of teen birth rates: association with community income and income inequality. *Maternal and child health journal*, *5*(3), 161-167.

Gold, R., Kennedy, B., Connell, F., & Kawachi, I. (2002). Teen births, income inequality, and social capital: developing an understanding of the causal pathway. *Health & place*, *8*(2), 77-83.

Haisley, E., Mostafa, R., & Loewenstein, G. (2008). Subjective relative income and lottery ticket purchases. *Journal of Behavioral Decision Making*, *21*(3), 283-295.

Kaplan, G. A., Pamuk, E. R., Lynch, J. W., Cohen, R. D., & Balfour, J. L. (1996). Inequality in income and mortality in the United States: analysis of mortality and potential pathways. *Bmj*, *312*(7037), 999-1003.

Kawachi, I., & Kennedy, B. P. (1999). Income inequality and health: pathways and mechanisms. *Health services research*, *34*(1 Pt 2), 215.

Kawachi, I., & Subramanian, S. V. (2014). Income inequality. *Social epidemiology*, *126*.

Kawachi, I., Kennedy, B. P., & Glass, R. (1999). Social capital and self-rated health: a contextual analysis. *American journal of public health*, *89*(8), 1187-1193.

Kawachi, I., Kennedy, B. P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American journal of public health*, *87*(9), 1491-1498.

Kelly, M. (2000). Inequality and crime. *Review of economics and Statistics*, *82*(4), 530-539.

Kennedy, B. P., Kawachi, I., Prothrow-Stith, D., Lochner, K., & Gupta, V. (1998). Social capital, income inequality, and firearm violent crime. *Social science & medicine*, *47*(1), 7-17.

Krohn, M. D. (1976). Inequality, Unemployment and Crime: A Cross□National Analysis. *TheSociological Quarterly*, *17*(3), 303-313.

Kuziemko, I., Buell, R. W., Reich, T., & Norton, M. I. (2014). "Last-place aversion": Evidence and redistributive implications. *The Quarterly Journal of Economics*, *129*(1), 105-149.

Lejuez, C. W., Read, J. P., Kahler, C. W., Richards, J. B., Ramsey, S. E., Stuart, G. L., ... & Brown, R. A. (2002). Evaluation of a behavioral measure of risk taking: the Balloon Analogue Risk Task (BART). *Journal of Experimental Psychology: Applied*, *8*(2), 75.

Levitt, S. D., & Venkatesh, S. A. (2000). An economic analysis of a drug-selling gang's finances. *The Quarterly Journal of Economics*, *115*(3), 755-789.

Lhila, A., & Simon, K. I. (2010). Relative deprivation and child health in the USA. *Social Science & Medicine*, *71*(4), 777-785.

Marmot, M. G., & Sapolsky, R. (2014, September). Of baboons and men: social circumstances, biology, and the social gradient in health. In *Sociality, hierarchy, health: Comparative biodemography: Papers from a workshop*.

Massing, M. W., Rosamond, W. D., Wing, S. B., Suchindran, C. M., Kaplan, B. H., & Tyroler, H. A. (2004). Income, income inequality, and cardiovascular disease mortality: relations among county populations of the United States, 1985 to 1994. *Southern medical journal*, *97*(5), 475-485.

Mishra, S., & Carleton, R. N. (2017). Use of online crowdsourcing platforms for gambling research. *International Gambling Studies*, *17*(1), 125-143.

Mishra, S., & Novakowski, D. (2016). Personal relative deprivation and risk: An examination of individual differences in personality, attitudes, and behavioral outcomes. *Personality and Individual Differences*, *90*, 22-26.

Mishra, S., Barclay, P., & Lalumière, M. L. (2014). Competitive disadvantage facilitates risk taking. *Evolution and Human Behavior*, *35*(2), 126-132.

Mishra, S., Hing, L. S. S., & Lalumiere, M. L. (2015). Inequality and risk-taking. *Evolutionary Psychology*, *13*(3), 1474704915596295.

Molarius, A., Seidell, J. C., Sans, S., Tuomilehto, J., & Kuulasmaa, K. (2000). Educational level, relative body weight, and changes in their association over 10 years: an international perspective from the WHO MONICA Project. *American Journal of Public Health*, *90*(8), 1260.

Newman, B. J., Johnston, C. D., & Lown, P. L. (2015). False consciousness or class awareness? Local income inequality, personal economic position, and belief in American meritocracy. *American Journal of Political Science*, *59*(2), 326-340.

Oppenheimer, E., Tobutt, C., Taylor, C., & Andrew, T. (1994). Death and survival in a cohort of heroin addicts from London clinics: a 22□year follow□up study. *Addiction*, *89*(10), 1299- 1308.

Osborne, D., & Sibley, C. G. (2013). Through rose-colored glasses: System-justifying beliefs dampen the effects of relative deprivation on well-being and political mobilization. *Personality and Social Psychology Bulletin*, *39*(8), 991-1004.

Payne, B. K., Brown-Iannuzzi, J. L., & Hannay, J. W. (2017). Economic inequality increases risk taking. *Proceedings of the National Academy of Sciences*, *114*(18), 4643-4648.

Perucci, C. A., Davoli, M., Rapiti, E., Abeni, D. D., & Forastiere, F. (1991). Mortality of intravenous drug users in Rome: a cohort study. *American Journal of Public Health*, *81*(10), 1307-1310.

Pickett, K. E., & Wilkinson, R. G. (2009). Greater equality and better health.

Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: a causal review. *Social science & medicine*, *128*, 316-326.

Pickett, K. E., Kelly, S., Brunner, E., Lobstein, T., & Wilkinson, R. G. (2005). Wider income gaps, wider waistbands? An ecological study of obesity and income inequality. *Journal of Epidemiology & Community Health*, *59*(8), 670-674.

Pickett, K. E., Mookherjee, J., & Wilkinson, R. G. (2005). Adolescent birth rates, total homicides, and income inequality in rich countries. *American Journal of Public Health*, *95*(7), 1181-1183.

Ragnarsdóttir, B. H., Bernburg, J. G., & Ólafsdóttir, S. (2013). The global financial crisis and individual distress: the role of subjective comparisons after the collapse of the Icelandic economy. *Sociology*, *47*(4), 755-775.

Saez, E., & Zucman, G. (2016). Wealth inequality in the United States since 1913: Evidence from capitalized income tax data. *The Quarterly Journal of Economics*, *131*(2), 519-578.

Sapolsky, R. M. (2005). The influence of social hierarchy on primate health. *Science*, *308*(5722), 648-652.

Shepelak, N. J. (1989). Ideological stratification: American beliefs about economic justice. *Social Justice Research*, *3*(3), 217-231.

Tabri, N., Dupuis, D. R., Kim, H. S., & Wohl, M. J. (2015). Economic mobility moderates the effect of relative deprivation on financial gambling motives and disordered gambling. *International Gambling Studies*, *15*(2), 309-323.

Uslaner, E. M. (2002). *The moral foundations of trust*. Cambridge University Press.

Uslaner, E. M., & Brown, M. (2005). Inequality, trust, and civic engagement. *American politics research*, *33*(6), 868-894.

Veblen, T. (1934). *The Theory of the Leisure Class: An Economic Study of Institutions; With a Foreword by Stuart Chase*. Modern Library.

Walasek, L., & Brown, G. D. (2015). Income inequality and status seeking: Searching for positional goods in unequal US states. *Psychological Science*, *26*(4), 527-533.

Wheeler, L. (1966). Motivation as a determinant of upward comparison. *Journal of Experimental Social Psychology*, *1*, 27-31.

Wilkinson, R. G. (1997). Socioeconomic determinants of health: Health inequalities: relative or absolute material standards?. *Bmj*, *314*(7080), 591.

Wilkinson, R. G., & Pickett, K. E. (2006). Income inequality and population health: a review and explanation of the evidence. *Social science & medicine*, *62*(7), 1768-1784.

Wilkinson, R. G., & Pickett, K. E. (2007). The problems of relative deprivation: why some societies do better than others. *Social science & medicine*, *65*(9), 1965-1978.

Wilkinson, R. G., & Pickett, K. E. (2009). Income inequality and social dysfunction. *Annual Review of Sociology*, *35*, 493-511.

Wilson, M., & Daly, M. (1997). Life expectancy, economic inequality, homicide, and reproductive timing in Chicago neighbourhoods. *BMJ: British Medical Journal*, *314*(7089), 1271.

Yates, J. (1992). *Risk-taking behavior*. John Wiley & Sons.

Yngwe, M. Å., Fritzell, J., Lundberg, O., Diderichsen, F., & Burström, B. (2003). Exploring relative deprivation: is social comparison a mechanism in the relation between income and health?. *Social science & medicine*, *57*(8), 1463-1473.

(2013, February 28th). For Fourth Year, Hawaii No. 1 in Well-Being, W.Va. Last. Retrieved from http://news.gallup.com/poll/160730/fourth-year-hawaii-no-wellbeing-last.aspx

(2017, January 16th). Just 8 Men Own Same Wealth as Half the World. Retrieved from https://www.oxfam.org/en/pressroom/pressreleases/2017-01-16/just-8-men-own-same-wealth-half-world